VOLUME 1 • ISSUE 2 • JULY 2010

The NICHD Connection

July 2010

INSIDE THIS ISSUE

EDITOR-IN-CHIEF
Shana Spindler, PhD
spindlersr@mail.nih.gov

LAYOUT/DESIGN
Nichole Jonas
jonasnic@mail.nih.gov

CONTRIBUTORS
Fiona Mitchell, PhD
Jason Riley, PhD

PHOTOGRAPHY
Jeremy Swan
swanjere@mail.nih.gov

Hot Off the Press: Collagen and Carcinomas

By Shana Spindler

Collagen is the most abundant protein in the human body. Without it, our connective tissues — bone, skin, and tendons — would lose their most crucial properties leading to devastating disorders. Several of the collagen-related diseases stem from the inability to join different collagen chains into proper combinations. For example, some rare cases of connective tissue disorders with joint hypermobility and cardiac valvular problems are caused by mutations in COL1A2, the gene coding for the type I collagen α2(I) chain. The absence of the α2 chain triggers the irregular formation of type I collagen containing only the α1 chain, known as α1 homotrimers.

While studying the α1-homotrimers found in patients with collagen α2(I)-deficiency, a group led by Dr. Elena Makareeva in the lab of Dr. Sergey Leikin at NICHD discovered homotrimer resistance to enzymes that normally cleave collagen, known as MMPs. Makareeva's keen insight into the function of MMPs led her to question if collagen homotrimers, which can be found in cancerous tissue, are responsible for cancer cell invasion.

To verify that α1-homotrimers were indeed immune to MMP activity, Makareeva's team mixed human and mouse collagens, both in heterotrimeric and homotrimeric forms, with four different types of human MMPs. In all cases, the collagen homotrimers were cleaved five to ten times slower than the heterotrimers, with no difference between human and mouse collagens.

Makareeva next asked if the collagen homotrimers reported in cancer cells were synthesized in the cancer cells themselves. To this end, she grew normal fibroblasts, a cell type known to synthesize collagen, and nine different cancer cell lines in culture. While the normal fibroblasts contained only collagen heterotrimers, 15% to 40% of the collagen in cancer cells was homotrimeric. Makareeva's team found similar results after injecting human cancer cells into a mouse recipient, confirming that cancer tissue — not normal tissue — produces collagen homotrimers.

Why might cancer cells produce collagen homotrimers? In a final experiment, Makareeva's team found that cancer cells divide and migrate faster

(continued on page 4)

Letter from the Editor

It's been a hot start to the summer! In *The NICHD Connection* July issue, we are excited to report that two of our own, Miho Matsuda and Yu Chen, were awarded the prestigious K-99 grant and 2010 Intramural AIDS fellowship, respectively. Our first "Hot off the Press" report features Elena Makareeva's impressive carcinoma study in the June issue of *Cancer Research*. In our new "Committee Corner" column—a series of articles designed to present the resources provided by the NICHD Fellows Committee—Jason Riley describes a potential resource database that can be utilized for finding equipment or technical skill-sets. Summer also brings plenty of rain and shine, and Fiona Mitchell describes a great opportunity to grow our own produce at the community garden. Finally, don't forget to check out the upcoming July events!

If you like this newsletter and want to contribute (or you think you can write something better!), we highly encourage your participation! I always welcome email at **spindlersr@mail.nih.gov.**

Your Editor-in-Chief,
Shana Spindler, PhD

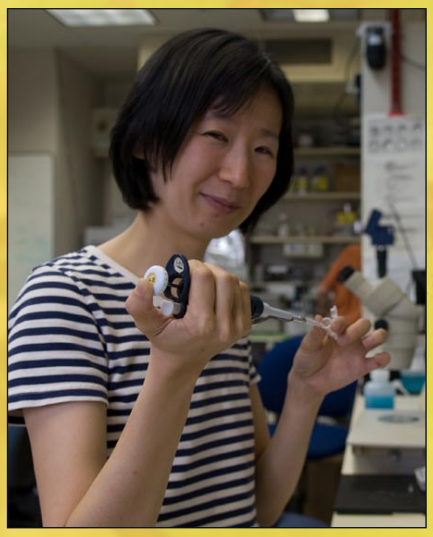
Postdoctoral IRTA Fellow
Laboratory of Ajay Chitnis
Program in Genomics of Differentiation
Building 6B, Room 3B326

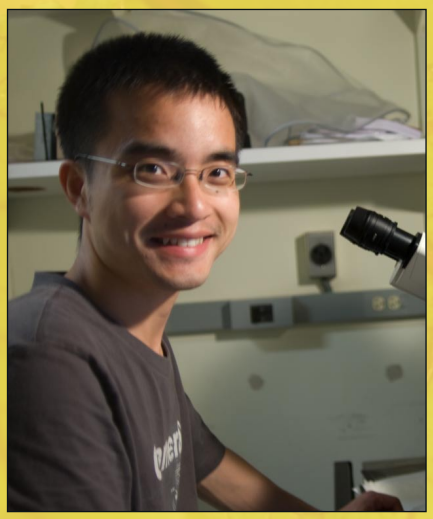
Award Announcements

DR. MIHO MATSUDA in the laboratory of Dr. Ajay Chitnis has just been awarded the highly competitive *K99 Pathway to Independence* award by NICHD. This is our intramural program's second K99 award and the first one to be funded through our institute. Miho studies the development of the Zebrafish posterior lateral line — a sensory organ that senses water movement and vibration — as a model to understand the molecular mechanisms of metastasis, the process by which tumor cells acquire migratory characteristics. Congratulations, Miho!

Congratulations to **YU CHEN** for earning the *2010 Intramural AIDS Fellowship*! Yu Chen, a postdoctoral fellow in the laboratory of Dr. Jennifer Lippincott-Schwartz, studies HIV virus intracellular trafficking and release. He is particularly pleased about the excellent imaging facilities in Jennifer's lab and is excited about what he can accomplish at the NIH.

Miho Matsuda





Yu Chen

Committee Corner

By Jason Riley

Dear NICHD Fellows,

Welcome to Committee Corner, our monthly opportunity to fill you in on committee resources and to ask for your help making NICHD a top place for fellows.

First, let me explain this feature of the newsletter: the Committee Corner column will update fellows on committee activities, appeal for your participation to continuously improve fellow resources and plan events at the NICHD, and inform you about anything—well—committee-ish. That being said, we still need a few more hands to accomplish all of the committee's goals—social events, a website, the newsletter, and so on. In fact, if there is something you think we should be doing for you, we'd appreciate your input at our meetings. If you are interested in taking part in the committee (very small time commitment for a very nice line on your resume/CV), please email me at **rileyja@mail.nih.gov**, and I will invite you to the next meeting.

To the purpose of this month's corner then! We plan to initiate a resource database for NICHD. We would like to assemble a list of equipment around the institute to document the range of resources we have in each of our labs, which might be available for use by other groups. In times of thrifty budgets, it behooves us as fellows to help out in every way we can. So I urge each of you to discuss with your section, program, or branch chiefs the equipment and facilities that you have which could be used by others at NICHD.

Once you have identified your resources, please let me know via email with a name of the equipment, brand, model number, and any details that another potential user might need. Once I have enough information, I will establish a database that will be uploaded to our committee website in excel format. Eventually, fellows will be able to update it themselves! In the meantime, we will collect all information by email at **rileyja@mail.nih.gov**.

Best regards from me and the committee. See you at The Burger Joint, if not before!

Jason Riley

The Community Garden

By Fiona Mitchell

The NIH/NICHD community garden project has now entered its second growing season, with those involved looking forward to a good harvest over the next few months. A group of fellows, mainly from NICHD, currently share 11 plots on an area of land that was approved for use as a vegetable patch on Earth Day in April 2009. This was around the same time that the newly installed First Lady, Michelle Obama, oversaw the creation of a vegetable garden on the White House lawn, and many people are now starting to see the satisfaction that a gardening venture of this kind can bring. In establishing the gardens, the plan was to give intramural fellows an opportunity to step outdoors during the day in order to help preserve their sanity and gain the nutritional benefit of growing and consuming their own fresh produce. After a day spent indoors at the bench or in front of a computer analyzing streams of data, it is an altogether different thing to get your hands dirty battling with the weeds or harvesting potatoes. Those involved have said that it has helped them to maintain perspective and stay "rooted" in reality.

The idea of a vegetable garden at NIH is not new, however. During World War Two, the public was encouraged to plant "Victory Gardens," and over 20 million were created across the USA. The aim of this was to help people deal with food shortages, and one of these gardens was sited within the NIH campus. Once again, people are taking an interest in cultivating their own food — although now this is prompted not by war, but rather a heightened realization of the economic and environmental consequences of our consumer culture. More and more people are striving to attain a greater degree of self-sufficiency and the ability to grow their own food. The NIH gardens allow fellows — whether they live in a high-rise apartment or a downtown row house — to enjoy the benefits that growing their own produce can bring.

See photo gallery on page 7

Collagen and Carcinomas

(continued from page 1)

on a cell culture substrate containing homotrimer rather than heterotrimer fibers. "We propose that cancer cells may use MMP-resistant homotrimer fibers as invasion roadways," explains Makareeva.

In the future, Makareeva hopes to find specific probes that will home in on collagen homotrimers, while avoiding collagen heterotrimers. She states that researchers could use probes for tumor detection and treatment. "Such a probe may work as a delivery tool, bringing drugs only to tumor cells," explains Makareeva, "or it may help to visualize the leading edge of a tumor, which is crucial during surgery."

Reference: Makareeva et al. Carcinomas Contain a Matrix Metalloproteinase-Resistant Isoform of Type I Collagen Exerting Selective Support to Invasion. *Cancer Research*: 70(11) June 1, 2010.

Event Announcements

TUESDAY, JULY 13th, 8:30AM – 12:00PM

Grants: Coping with the Changes at NIH

NICHD Workshop with Dr. David Morrison, Co-Founder and Member of Grant Writers' Seminars and Workshops, LLC

Learn about the new SF424 forms, the shorter (12-page) grants application now in use at NIH, and what reviewers are now emphasizing. Each participant will receive the 2010 Grant Application Writer's Workbook.

Please register through Brenda Hanning, **hanningb@mail.nih.gov**.

TUESDAY, JULY 27th, 12:00PM – whenever you're done eating

Lunch at The Burger Joint in Bethesda

Meet in front of Building 50

FRIDAY, JULY 30th, 10:00AM – 12:00PM

Team Science Workshop

Led by Dr. Michelle Bennett and Dr. Howard Gadlin

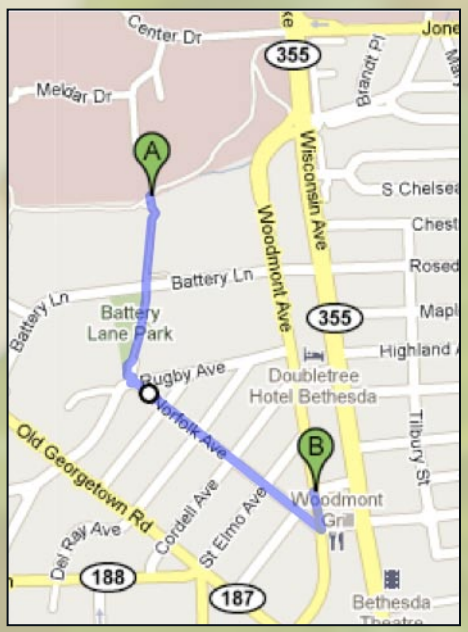
See article on **PAGE 6** for a description of this event!

Please register through Brenda Hanning, **hanningb@mail.nih.gov.**

July NICHD Fellow Lunch Outing

JULY 27, 12:00PM

Join us for a NICHD Fellow lunch outing to **THE BURGER JOINT** in Bethesda! Their lunch special includes a burger, fries, and drink for $8.99. For the vegetarians among us, home-made veggie burgers are available as well.



WHERE AND WHEN TO MEET:

On **JULY 27TH**, we will meet in front of **BUILDING 50** at **12PM**. To get to Bethesda, we will go out the employee pedestrian exit that is just south of building 38A, which will allow us to walk along the trolley trail to Norfolk Ave (see map at right). This will give us a short, scenic walk to the restaurant (about 10 min. walk time). If your building is already near the south side of campus, feel free to meet us at the pedestrian exit. Hope to see you there!!!

Team Science Workshop

As science becomes more specialized, we increasingly rely on the expertise of fellow scientists to help guide novel directions in our research and find innovative applications for our findings. In a Question/Answer session with NIH Ombudsman DR. HOWARD GADLIN and NHLBI Deputy Scientific Director DR. MICHELLE BENNETT about their upcoming "Team Science" workshop, we learned a bit about what to expect from this great opportunity!

Take a look at what Dr. Gadlin and Dr. Bennett have to say about team science:

Q: What is team science?

A: We are talking about team science (and collaboration) from the perspective of the researcher who has an idea for solving a complex scientific question or who has been asked by someone in a more senior position to pull together a group to tackle an challenging research issue that requires input from people from different backgrounds and disciplines. It is a collaborative, integrated, approach requiring cooperation and excellent communication skills that results in a highly productive research effort.

Q: What is the goal of your upcoming workshop relating to team science?

A: The goal is to introduce the group to the importance of understanding the intricacies of working as a member of or leading a collaborative team. We often hear people say that many of the things seem so obvious - and on the face of it, they might be. However, integrating the principles we talk about into who you are as a team member or leader is not as obvious.

Q: What can a fellow expect to take away from this workshop?

A: An introduction to knowledge, skills, tools, and approaches that when used can greatly enhance not only their experiences in collaborative work - but can contribute to satisfaction on the part of those working with them.

Q: Please describe your vision of team science in the future—what role will it play in research and data analysis?

A: In the future team science and collaboration will be part of how research is done, planned, reviewed, rewarded, and recognized. There will be no need for workshops like this.

The Team Science workshop will occur on **JULY 30th** from **10:00AM – 12:00PM**.

Please register through Brenda Hanning, **hanningb@mail.nih.gov**.

VISIT US ONLINE: http://science.nichd.nih.gov/confluence/display/newsletter

The Community Garden

for even more pictures, visit us online!